REMARKS

Claim 2 has been previously cancelled. The claims remaining in the application are 1 and 3-13.

Rejection Under 35 U.S.C. § 103

The Office Action has rejected claims 1-8, 10 and 13 under 35 U.S.C. 103(a) as being unpatentable over Bogart (U.S. 6,452,696) in view of Haas (U.S. 2004/0012824). This rejection is respectfully traversed.

The Office Action has rejected claim 9 under 35 U.S.C. 103(a) as being unpatentable over Bogart (U.S. 6,452,696) in view of Haas (U.S. 2004/0012824), as applied to claim 1 above, and further in view of Boqart (U.S. 6,917,447). This rejection is respectfully traversed.

The Office Action has rejected claim 11 under 35 U.S.C. 103(a) as being unpatentable over Bogart (U.S. 6,452,696) in view of Haas (U.S. 2004/0012824) and further in view of McCoy (U.S. 6,576,883). This rejection is respectfully traversed.

The Office Action has rejected claim 12 under 35 U.S.C. 103(a) as being unpatentable over Bogart (U.S. 6,452,696) in view of Haas (U.S. 2004/0012824) and further in view of Hirahata (U.S. 5,311,216). This rejection is respectfully traversed.

On page 3 of the Office Action the Examiner states:

> Bogart discloses all the basic features of the instantly claimed invention: a printing apparatus for exposing an image onto a photosensitive medium (refer to Figure 2) with a linear array of exposure printhead (refer to element 1 of Figure 1 and lines 35-39, and 56-58 of column 3) having each exposure source operable a variable intensity (refer to column 4, lines 20-23), a shuttle or carrying frame/vehicle for moving the printhead over the photosensitive medium in a reciprocating motion between then carriage assembly.

This particular arrangement has been know in the prior art as Bogart states in column 1, lines 20-34, "In the field of photographic digital printers and image setters, the use of multiple light sources to simultaneously expose multiple individual pixels is well known. U.S. Pat. No. 3,988,742

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describes using light emitting diodes (LEDs) and fiber optic tubes to deliver light to the photosensitive material."

In particular, Dodge (U.S. 4,780,730, (lines 27-42 and lines 61-68 of column 3)) describes a printhead consisting of an array of LEDs mounted on a movable carriage which traverses across a photosensitive medium in a bi-directional manner. The carriage assembly is moved by use of a steel belt around a drum. This is the same apparatus as Bogart describes except Bogart does not describe the belt.

Thus Bogart's claims are limited to the particular object of his invention which is described in column 2, lines 1-5 where he says, "The present invention is directed to a method and apparatus for normalizing the output of multiple light sources used to expose a photosensitive material in order to print high quality continuous tone and/or color images."

The method of Bogart for normalizing the output of <u>each</u> exposure source involves printing a test image onto photosensitive material, processing the photosensitive material to reveal the image, scanning the image into a computer to analyze the exposure density to determine the intensity exposure and using this information to determine intensity correction values for each of the multiple light sources (column 2, lines 34-52). This method is clearly shown in Figures 5 on page 8 and Figure 6 on page 9.

It is well known in the art that the output of one LED will vary considerable from the output of another due to process variations in the manufacture of LEDs. It is also well known to drive each LED (or any energy source) with a correction factor to normalize the output of each LED to a standard energy output to obtain equal exposure to overcome LED variability. A method typically used to determine the LEDs output relative to a driving input is to measure the energy output with a photodetector. As described above, Bogart's method uses the density of the developed photosensitive media to measure the individual outputs of <u>each LED</u> and from this produce correction factors which are stored in normalization lookup tables.

A second feature of Bogart is to correct for reciprocity failure of the media. Bogart states (column 1, lines 55-63 and column 2, lines 52-60), "The properties of latent image degradation and reciprocity failure can produce visible artifacts in the image proximate to the edges of a scan strip. That is, light sources

close to the edge of a scan strip typically become more effective at higher densities than the light sources in the middle of the scan. By individually normalizing the light sources in accordance with the invention over the range of image densities within the printing spectrum, this variation can be effectively eliminated."

As stated in the Office Action on page 9, "The use of the Bogart reference by the Office is for the purpose of establishing the known limitations presented with respect to an exposure source for scanning an image onto a photosensitive medium."

The present invention is not concerned with those limitations describe by the Bogart reference concerning the <u>individual responses of each LED</u> due to variations and the resultant necessity of calculating different efficiency data to be stored in lookup tables for each LED exposure source to normalize their response and is not concerned with exposure errors due to latent image degradation or reciprocity failure of the photosensitive media as describe in the Bogart reference.

The Office Action states on page 3, "Though Haas does not specifically refer to a printing apparatus, Haas teaches an exposure control means/circuitry for adjusting/varying the exposure according to a velocity determined from the linear encoder of a <u>movable exposure source</u> (refer to paragraph 0027 and 0028)."

The phrase 'movable exposure source' is not read anywhere in either Haas or McCoy (U.S. 6,576,883B1). Neither Haas or McCoy teach a moveable exposure source or adjusting the intensity of an exposure source. Both rather describe a movable carriage that has a CCD which is <u>not</u> used to expose photosensitive media. It is well known that an LED is not equivalent to a CCD in either structure, function, or result.

Haas describes in the abstract, "A method for scanning an image of media comprises biasing a scanner carriage for movement relative to a platen." He continues in [0003], "The optical carriage has optics, also known as a scanner head,...These optics map light...to a charge couple device (CCD) or the like. The CCD converts optical photons into electrons, used to create a data signal. The data provided by the CCD is processed into a final form such as an image file."

McCoy states in the abstract, "A scanner includes a photodetector, a dc motor drive and a gain compensation control for non-linearly adjusting the gain of at least one channel of the photodetector." McCoy further states (column 1, lines 6-10), "The present invention relates to an exposure control for an optical scanner. A typical optical scanner uses a motor drive to move a charge coupled device ("CCD") across a sheet of paper."

Haas states in [0028], "...to track the velocity carriage 101 is traveling and/or the position of carriage 101 at any point in time. This tracking is desirable for control of exposure..." But Haas does not describe how the velocity tracking information is used to control the exposure of the CCD. Even if Haas had discussed how to control "exposure" of a CCD, printing an image on a photosensitive media with a LED is different than adjusting a CCD exposure.

McCoy however, states (column 3, lines 23-28), "The ASIC 18 includes an exposure control 34 , which receives speed or position information from the encoder assembly 24 and adjusts the exposure time of the CCD 26 such that exactly one pixel distance is traversed during each exposure time, regardless of any position or velocity errors in controlling the dc motor 20."

It is also clear that the exposure control method does not involve multiplication of a corrective factor but the gating of an on time for the integration period of the CCD. McCoy states (column 3, lines 23-28), "The exposure control 34 generates the transfer gate signals TG 1, TG 2 and TG 3 for the three channels of the CCD 26. To scan a line, the exposure control 34 de-asserts the transfer gate signal to begin an exposure time, processes the encoder pulses and then asserts the transfer gate signals to stop the exposure time."

McCoy summarizes in (column 3, lines 36-39), "Thus, the exposure control 34 varies the exposure time to ensure that each exposure time corresponds to the same displacement and that the lines of pixels in a scanned image are all of uniform size."

The Office Action states on page 7 it would be obvious to one skilled in the art ... to apply the combination method taught by Haas and McCoy, "... for the purpose of managing/regulating the exposure/intensity of an exposure source moving at varying speeds." From the detail discussion of the Haas and McCoy references it can be seen that neither addresses the same issues of the instantly applied patent.

With respect to the combination of Bogart, Haas, and Hirahata, there is a misunderstanding of what is shown in both Bogart and Haas as described above. Bogart corrects individual LED response to the media for each of the LEDs in the printhead. Haas does not correct an intensity of exposure for the CCDs in the device, but rather gates the integration time of a CCD based on philosophy. None of these references, either individually or in combination, can be added together to show all of the features, or operate in the same manner, as claimed in the present invention.

The Examiner's comments in paragraph 7 are noted, however, the term "instantaneous velocity" is used in the claims, while the term "feedback" is not used, "adjusting the variable intensity" of the source is clearly a feedback loop. An overall reading of the independent claims, while not using language identical to the arguments, shows that the claims correspond to the arguments presented.

CONCLUSION

Dependent claims not specifically addressed add additional limitations to the independent claims, which have been distinguished from the prior art and are therefore also patentable.

In conclusion, none of the prior art cited by the Office Action discloses the limitations of the claims of the present invention, either individually or in combination. Therefore, it is believed that the claims are allowable.

If the Examiner is of the opinion that additional modifications to the claims are necessary to place the application in condition for allowance, he is invited to contact Applicant's attorney at the number listed below for a telephone interview and Examiner's amendment.

Respectfully submitted,

Attorney for Applicant(s)
Registration No. 29,134

Nelson A. Blish/tmp
Rochester, NY 14650
Telephone: 585-588-2720

Facsimile: 585-477-4646

If the Examiner is unable to reach the Applicant(s) Attorney at the telephone number provided, the Examiner is requested to communicate with Eastman Kodak Company Patent Operations at (585) 477-4656.